

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (currently amended): A digital baseband (DBB) receiver for receiving and processing a wireless communication signal, the DBB receiver comprising:

(a) at least one demodulator which outputs analog real and imaginary signal components on real and imaginary signal paths, respectively, in response to receiving the communication signal;

(b) an analog to digital converter (ADC) coupled to the real and imaginary signal paths for receiving the analog real and imaginary signal components and outputting respective digital real and imaginary signal components; and

(c) a digital cross-talk compensation module in communication with the ADC, wherein the digital cross-talk compensation module receives the digital real and imaginary signal components, estimates cross-talk interference on the real signal component resulting from energy from the imaginary signal component being induced into the real signal path, estimates cross-talk interference on the imaginary signal component resulting from energy from the real signal component being induced into the imaginary signal path, and outputs digital real and imaginary cross-talk compensated signal components, wherein the digital cross-talk compensation module comprises:

(i) a real signal path for receiving the digital real signal component;

(ii) an imaginary signal path for receiving the digital imaginary signal component;

(iii) a first delay unit, coupled to the real signal path, for receiving the digital real signal component and outputting the digital real signal component after a first predetermined delay period expires;

(iv) a first adder, coupled to the real signal path and the first delay unit, for adding a negative value of the digital real signal component to the delayed digital real signal component output by the first delay unit to generate a first resulting signal;

(v) a first multiplier, coupled to the first adder, for multiplying the first resulting signal with a first compensation signal having a first predetermined value ( $K_1$ ) to generate a second resulting signal;

(vi) a second delay unit, coupled to the imaginary signal path, for receiving the digital imaginary signal component and outputting the digital imaginary signal component after a second predetermined delay period expires; and

(vii) a second adder, coupled to the second delay unit and the first multiplier, for outputting the digital imaginary cross-talk compensated signal component.

Claim 2 (canceled)

3. (currently amended): The DBB receiver of claim 1 ~~claim 2~~ further comprising:

(d) a controller in communication with the ADC and the digital cross-talk compensation module.

Claims 4-7 (canceled)

8. (currently amended): A wireless transmit/receive unit (WTRU) for receiving and processing a wireless communication signal, the WTRU comprising:

(a) a demodulator which outputs analog real and imaginary signal components on real and imaginary signal paths, respectively, in response to receiving the communication signal;

(b) an analog to digital converter (ADC) coupled to the real and imaginary signal paths for receiving the analog real and imaginary signal components and outputting respective digital real and imaginary signal components; and

(c) a digital cross-talk compensation module in communication with the ADC, wherein the digital cross-talk compensation module receives the digital real and imaginary signal components, estimates cross-talk interference on the real signal component resulting from energy from the imaginary signal component being induced into the real signal path, estimates cross-talk interference on the imaginary signal component resulting from energy from the real signal component being induced into the imaginary signal path, and outputs digital real and imaginary cross-talk compensated signal components, wherein the digital cross-talk compensation module comprises:

(i) a real signal path for receiving the digital real signal component;

(ii) an imaginary signal path for receiving the digital imaginary signal component;

(iii) a first delay unit, coupled to the real signal path, for receiving the digital real signal component and outputting the digital real signal component after a first predetermined delay period expires;

(iv) a first adder, coupled to the real signal path and the first delay unit, for adding a negative value of the digital real signal component to the delayed digital real signal component output by the first delay unit to generate a first resulting signal;

(v) a first multiplier, coupled to the first adder, for multiplying the first resulting signal with a first compensation signal having a first predetermined value ( $K_1$ ) to generate a second resulting signal;

(vi) a second delay unit, coupled to the imaginary signal path, for receiving the digital imaginary signal component and outputting the digital imaginary signal component after a second predetermined delay period expires; and

(vii) a second adder, coupled to the second delay unit and the first multiplier, for outputting the digital imaginary cross-talk compensated signal component.

Claim 9 (canceled)

10. (currently amended): The WTRU of claim 8 ~~claim 9~~ further comprising:

(d) a controller in communication with the ADC and the digital cross-talk compensation module.

Claims 11-14 (canceled)

15. (currently amended): An integrated circuit (IC) for receiving and processing a wireless communication signal, the IC comprising:

(a) a demodulator which outputs analog real and imaginary signal components on real and imaginary signal paths, respectively, in response to receiving the communication signal;

(b) an analog to digital converter (ADC) coupled to the real and imaginary signal paths for receiving the analog real and imaginary signal components and outputting respective digital real and imaginary signal components; and

(c) a digital cross-talk compensation module in communication with the ADC, wherein the digital cross-talk compensation module receives the digital real and imaginary signal components, estimates cross-talk interference on the real signal component resulting from energy from the imaginary signal component being induced into the real signal path, estimates cross-talk interference on the imaginary signal component resulting from energy from the real signal component being induced into the imaginary signal path, and outputs digital real and imaginary cross-talk compensated signal components, wherein the digital cross-talk compensation module comprises:

- (i) a real signal path for receiving the digital real signal component;
- (ii) an imaginary signal path for receiving the digital imaginary signal component;
- (iii) a first delay unit, coupled to the real signal path, for receiving the digital real signal component and outputting the digital real signal component after a first predetermined delay period expires;
- (iv) a first adder, coupled to the real signal path and the first delay unit, for adding a negative value of the digital real signal component to the delayed digital real signal component output by the first delay unit to generate a first resulting signal;
- (v) a first multiplier, coupled to the first adder, for multiplying the first resulting signal with a first compensation signal having a first predetermined value ( $K_1$ ) to generate a second resulting signal;
- (vi) a second delay unit, coupled to the imaginary signal path, for receiving the digital imaginary signal component and outputting the digital imaginary signal component after a second predetermined delay period expires; and
- (vii) a second adder, coupled to the second delay unit and the first multiplier, for outputting the digital imaginary cross-talk compensated signal component.

Claim 16 (canceled)

17. (currently amended): The IC of claim 15 ~~claim 16~~ further comprising:

(d) a controller in communication with the ADC and the digital cross-talk compensation module.

Claims 18-21 (canceled)

22. (new): The DBB receiver of claim 1 wherein the digital cross-talk compensation module further comprises:

(viii) a third delay unit, coupled to the imaginary signal path, for receiving the digital imaginary signal component and outputting the digital imaginary signal component after a third predetermined delay period expires;

(ix) a third adder, coupled to the imaginary signal path and the third delay unit, for adding a negative value of the digital imaginary signal component to the delayed digital imaginary signal component output by the third delay unit to generate a third resulting signal;

(x) a second multiplier, coupled to the first adder, for multiplying the third resulting signal with a second compensation signal having a second predetermined value ( $K_2$ ) to generate a fourth resulting signal;

(xi) a fourth delay unit, coupled to the real signal path, for receiving the digital real signal component and outputting the digital real signal component after a fourth predetermined delay period expires; and

(xii) a fourth adder, coupled to the fourth delay unit and the second multiplier, for outputting the digital real cross-talk compensated signal component.

23. (new): The DBB receiver of claim 1 wherein the first predetermined delay period is larger than the second predetermined delay period.

24. (new): The DBB receiver of claim 22 wherein the third predetermined delay period is larger than the fourth predetermined delay period.

25. (new): The DBB receiver of claim 22 wherein the first and third predetermined delay periods are the same.

26. (new): The DBB receiver of claim 22 wherein the second and fourth predetermined delay periods are the same.

27. (new): The WTRU of claim 8 wherein the digital cross-talk compensation module further comprises:

(viii) a third delay unit, coupled to the imaginary signal path, for receiving the digital imaginary signal component and outputting the digital imaginary signal component after a third predetermined delay period expires;

(ix) a third adder, coupled to the imaginary signal path and the third delay unit, for adding a negative value of the digital imaginary signal component to the delayed digital imaginary signal component output by the third delay unit to generate a third resulting signal;

(x) a second multiplier, coupled to the first adder, for multiplying the third resulting signal with a second compensation signal having a second predetermined value ( $K_2$ ) to generate a fourth resulting signal;

(xi) a fourth delay unit, coupled to the real signal path, for receiving the digital real signal component and outputting the digital real signal component after a fourth predetermined delay period expires; and

(xii) a fourth adder, coupled to the fourth delay unit and the second multiplier, for outputting the digital real cross-talk compensated signal component.

28. (new): The WTRU of claim 8 wherein the first predetermined delay period is larger than the second predetermined delay period.

29. (new): The WTRU of claim 27 wherein the third predetermined delay period is larger than the fourth predetermined delay period.

30. (new): The WTRU of claim 27 wherein the first and third predetermined delay periods are the same.

31. (new): The WTRU of claim 27 wherein the second and fourth predetermined delay periods are the same.

32. (new): The IC of claim 15 wherein the digital cross-talk compensation module further comprises:

(viii) a third delay unit, coupled to the imaginary signal path, for receiving the digital imaginary signal component and outputting the digital imaginary signal component after a third predetermined delay period expires;

(ix) a third adder, coupled to the imaginary signal path and the third delay unit, for adding a negative value of the digital imaginary signal component to the delayed digital imaginary signal component output by the third delay unit to generate a third resulting signal;

(x) a second multiplier, coupled to the first adder, for multiplying the third resulting signal with a second compensation signal having a second predetermined value ( $K_2$ ) to generate a fourth resulting signal;

(xi) a fourth delay unit, coupled to the real signal path, for receiving the digital real signal component and outputting the digital real signal component after a fourth predetermined delay period expires; and

(xii) a fourth adder, coupled to the fourth delay unit and the second multiplier, for outputting the digital real cross-talk compensated signal component.

33. (new): The IC of claim 15 wherein the first predetermined delay period is larger than the second predetermined delay period.

34. (new): The IC of claim 32 wherein the third predetermined delay period is larger than the fourth predetermined delay period.

35. (new): The IC of claim 32 wherein the first and third predetermined delay periods are the same.

36. (new): The IC of claim 32 wherein the second and fourth predetermined delay periods are the same.

37. (new): A digital baseband (DBB) receiver for receiving and processing a wireless communication signal, the DBB receiver comprising:

(a) at least one demodulator which outputs analog real and imaginary signal components on real and imaginary signal paths, respectively, in response to receiving the communication signal;

(b) an analog to digital converter (ADC) coupled to the real and imaginary signal paths for receiving the analog real and imaginary signal components and outputting respective digital real and imaginary signal components; and

(c) a digital cross-talk compensation module in communication with the ADC, wherein the digital cross-talk compensation module receives the digital real and imaginary signal components, estimates cross-talk interference on the real signal component resulting from energy from the imaginary signal component being induced into the real signal path, estimates cross-talk interference on the imaginary signal component resulting from energy from the real signal component being induced into the imaginary signal path, and outputs digital real and imaginary cross-talk compensated signal components, wherein the digital cross-talk compensation module comprises:

- (i) a real signal path for receiving the digital real signal component;
- (ii) an imaginary signal path for receiving the digital imaginary signal component;
- (iii) a first delay unit, coupled to the imaginary signal path, for receiving the digital imaginary signal component and outputting the digital imaginary signal component after a first predetermined delay period expires;
- (iii) a first adder, coupled to the imaginary signal path and the first delay unit, for adding a negative value of the digital imaginary signal component to the delayed digital imaginary signal component output by the first delay unit to generate a first resulting signal;
- (iv) a first multiplier, coupled to the first adder, for multiplying the first resulting signal with a first compensation signal having a first predetermined value ( $K_2$ ) to generate a second resulting signal;

(v) a second delay unit, coupled to the real signal path, for receiving the digital real signal component and outputting the digital real signal component after a second predetermined delay period expires; and

(vi) a second adder, coupled to the second delay unit and the first multiplier, for outputting the digital real cross-talk compensated signal component.

38. (new): The DBB receiver of claim 37 wherein the digital cross-talk compensation module further comprises:

(vii) a third delay unit, coupled to the real signal path, for receiving the digital real signal component and outputting the digital real signal component after a third predetermined delay period expires;

(viii) a third adder, coupled to the real signal path and the third delay unit, for adding a negative value of the digital real signal component to the delayed digital real signal component output by the third delay unit to generate a third resulting signal;

(ix) a second multiplier, coupled to the third adder, for multiplying the third resulting signal with a second compensation signal having a second predetermined value ( $K_1$ ) to generate a fourth resulting signal;

(x) a fourth delay unit, coupled to the imaginary signal path, for receiving the digital imaginary signal component and outputting the digital imaginary signal component after a fourth predetermined delay period expires; and

(xi) a fourth adder, coupled to the fourth delay unit and the second multiplier, for outputting the digital imaginary cross-talk compensated signal component.

39. (new): The DBB receiver of claim 37 wherein the first predetermined delay period is larger than the second predetermined delay period.

40. (new): The DBB receiver of claim 38 wherein the third predetermined delay period is larger than the fourth predetermined delay period.

41. (new): The DBB receiver of claim 38 wherein the first and third predetermined delay periods are the same.

42. (new): The DBB receiver of claim 38 wherein the second and fourth predetermined delay periods are the same.

43. (new): A wireless transmit/receive unit (WTRU) for receiving and processing a wireless communication signal, the WTRU comprising:

(a) at least one demodulator which outputs analog real and imaginary signal components on real and imaginary signal paths, respectively, in response to receiving the communication signal;

(b) an analog to digital converter (ADC) coupled to the real and imaginary signal paths for receiving the analog real and imaginary signal components and outputting respective digital real and imaginary signal components; and

(c) a digital cross-talk compensation module in communication with the ADC, wherein the digital cross-talk compensation module receives the digital real and imaginary signal components, estimates cross-talk interference on the real signal component resulting from energy from the imaginary signal component being induced into the real signal path, estimates cross-talk interference on the imaginary signal component resulting from energy from the real signal component being induced into the imaginary signal path, and outputs digital real and imaginary cross-talk compensated signal components, wherein the digital cross-talk compensation module comprises:

(i) a real signal path for receiving the digital real signal component;

(ii) an imaginary signal path for receiving the digital imaginary signal component;

(iii) a first delay unit, coupled to the imaginary signal path, for receiving the digital imaginary signal component and outputting the digital imaginary signal component after a first predetermined delay period expires;

(iii) a first adder, coupled to the imaginary signal path and the first delay unit, for adding a negative value of the digital imaginary signal component to the delayed digital imaginary signal component output by the first delay unit to generate a first resulting signal;

(iv) a first multiplier, coupled to the first adder, for multiplying the first resulting signal with a first compensation signal having a first predetermined value ( $K_2$ ) to generate a second resulting signal;

(v) a second delay unit, coupled to the real signal path, for receiving the digital real signal component and outputting the digital real signal component after a second predetermined delay period expires; and

(vi) a second adder, coupled to the second delay unit and the first multiplier, for outputting the digital real cross-talk compensated signal component.

44. (new): The WTRU of claim 43 wherein the digital cross-talk compensation module further comprises:

(vii) a third delay unit, coupled to the real signal path, for receiving the digital real signal component and outputting the digital real signal component after a third predetermined delay period expires;

(viii) a third adder, coupled to the real signal path and the third delay unit, for adding a negative value of the digital real signal component to the delayed digital real signal component output by the third delay unit to generate a third resulting signal;

(ix) a second multiplier, coupled to the third adder, for multiplying the third resulting signal with a second compensation signal having a second predetermined value ( $K_1$ ) to generate a fourth resulting signal;

(x) a fourth delay unit, coupled to the imaginary signal path, for receiving the digital imaginary signal component and outputting the digital imaginary signal component after a fourth predetermined delay period expires; and

(xi) a fourth adder, coupled to the fourth delay unit and the second multiplier, for outputting the digital imaginary cross-talk compensated signal component.

45. (new): The WTRU of claim 43 wherein the first predetermined delay period is larger than the second predetermined delay period.

46. (new): The WTRU of claim 44 wherein the third predetermined delay period is larger than the fourth predetermined delay period.

47. (new): The WTRU of claim 44 wherein the first and third predetermined delay periods are the same.

48. (new): The WTRU of claim 44 wherein the second and fourth predetermined delay periods are the same.

49. (new): An integrated circuit (IC) for receiving and processing a wireless communication signal, the IC comprising:

(a) at least one demodulator which outputs analog real and imaginary signal components on real and imaginary signal paths, respectively, in response to receiving the communication signal;

(b) an analog to digital converter (ADC) coupled to the real and imaginary signal paths for receiving the analog real and imaginary signal components and outputting respective digital real and imaginary signal components; and

(c) a digital cross-talk compensation module in communication with the ADC, wherein the digital cross-talk compensation module receives the digital real and imaginary signal components, estimates cross-talk interference on the real signal component resulting from energy from the imaginary signal component being induced into the real signal path, estimates cross-talk interference on the imaginary signal component resulting from energy from the real signal component being induced into the imaginary signal path, and outputs digital real and imaginary cross-talk compensated signal components, wherein the digital cross-talk compensation module comprises:

- (i) a real signal path for receiving the digital real signal component;
- (ii) an imaginary signal path for receiving the digital imaginary signal component;
- (iii) a first delay unit, coupled to the imaginary signal path, for receiving the digital imaginary signal component and outputting the digital imaginary signal component after a first predetermined delay period expires;
- (iii) a first adder, coupled to the imaginary signal path and the first delay unit, for adding a negative value of the digital imaginary signal component to the delayed digital imaginary signal component output by the first delay unit to generate a first resulting signal;
- (iv) a first multiplier, coupled to the first adder, for multiplying the first resulting signal with a first compensation signal having a first predetermined value ( $K_2$ ) to generate a second resulting signal;

(v) a second delay unit, coupled to the real signal path, for receiving the digital real signal component and outputting the digital real signal component after a second predetermined delay period expires; and

(vi) a second adder, coupled to the second delay unit and the first multiplier, for outputting the digital real cross-talk compensated signal component.

50. (new): The IC of claim 49 wherein the digital cross-talk compensation module further comprises:

(vii) a third delay unit, coupled to the real signal path, for receiving the digital real signal component and outputting the digital real signal component after a third predetermined delay period expires;

(viii) a third adder, coupled to the real signal path and the third delay unit, for adding a negative value of the digital real signal component to the delayed digital real signal component output by the third delay unit to generate a third resulting signal;

(ix) a second multiplier, coupled to the third adder, for multiplying the third resulting signal with a second compensation signal having a second predetermined value ( $K_1$ ) to generate a fourth resulting signal;

(x) a fourth delay unit, coupled to the imaginary signal path, for receiving the digital imaginary signal component and outputting the digital imaginary signal component after a fourth predetermined delay period expires; and

(xi) a fourth adder, coupled to the fourth delay unit and the second multiplier, for outputting the digital imaginary cross-talk compensated signal component.

51. (new): The IC of claim 49 wherein the first predetermined delay period is larger than the second predetermined delay period.

52. (new): The IC of claim 50 wherein the third predetermined delay period is larger than the fourth predetermined delay period.

53. (new): The IC of claim 50 wherein the first and third predetermined delay periods are the same.

54. (new): The IC of claim 50 wherein the second and fourth predetermined delay periods are the same.